

63. How did one lunar photograph come from two images?

8-10 minutes

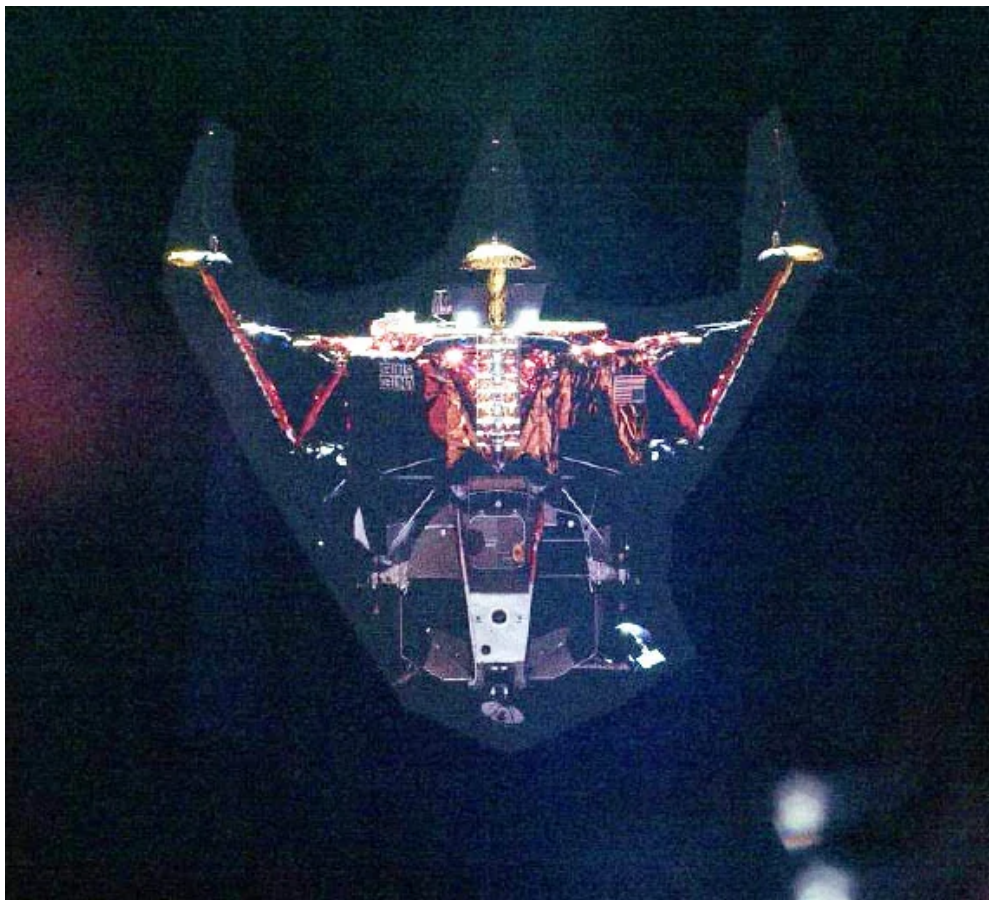
If you raise the brightness of the photo in the graphics editor, where the lunar module hangs against the background of black space (its NASA catalog number AS11-44-6592),



Image from the NASA archive, AS11-44-6592EN.

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then we will see traces of montage - as if someone had cut out the lunar module and pasted it into another photograph, where the black space is visible through the window.



Around the lunar module

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A few years ago, the cameraman Y. Elkhov wrote about this in his book, and recently he posted a fragment from this book on [Zen channel](#) .

This photo is still on the official NASA channel at:

<https://www.hq.nasa.gov/alsj/a11/AS11-44-6592HR.jpg>

Here's what Yuri Elkhov wrote about this photo:

The image of the Lunar Module "Eagle" is cut (and, moreover, cut out primitively and roughly) from some other photograph and inserted into photo # 26, with a fragment of the unsharp hatch of the Command Module "Columbia" in the foreground.

When you read the word "cut out", the first thought that came to you was that they took scissors and cut out a piece of the image. Some thought so, judging by the comments. Even some people with an engineering background thought so. But in fact, no one cut any image. No scissors, no blade, no razor. The image is unique, maybe one of a kind, so they didn't even touch it.

Combining images, or in other words, collage, is not an easy process, but it has been worked out for a long time in every detail. In this regard, I will talk about several methods of combining that are used in practice.

Of course, you can take a slide film with the image of the lunar module and cut out the fragment we need with scissors. The size of the frame (according to NASA) is 53x53 mm, so, armed with a watch magnifier and sharpened scissors, you can carefully cut the lunar module along the contour.



Armed with a magnifying glass like a watchmaker ...

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Then the cut out fragment must be smeared with glue and pressed against the frame, which depicts the black sky through the window. And what will be the result? It won't work!

Just imagine: on top of the image of the lunar module, you are superimposing a black square, another frame. The density of the black tone on the slide film is such that light is attenuated by a factor of about a thousand during transmission. Although the frame was taken on

reversible film, which itself is transparent, the space on the film is black and does not transmit light.

Probably, you do not like that we put black space on top of the module. You can swap frames, it won't change anything - the module will not be visible through the blackness of space. Therefore, we will leave this option - overlapping two slides, as unacceptable.

Let's consider another option. We print photos on colored paper, carefully cut out the desired area with scissors, glue it onto another frame on top and reshoot the resulting collage with a camera.

Can I do this? Of course. But what will be the result?

Most likely, due to the thickness of the paper, the seam border will be visible. But this is not the main inconvenience. After all, then we must reshoot this photograph (make a reproduction) so that it appears in the form of one frame on transparent film, as if it were a frame made by Hasselblad on the Moon.

However, any professional will immediately determine that the photo was re-captured. The fact is that on photographic paper, the brightest spot (white surface) reflects about 80% of the light, and the maximum blackness - about 4%. The brightness interval on photo paper is only 1:20, i.e. the brightest spot on the paper is only 20 times brighter than the blackest spot. And on the slide (and on positive film), the range of brightness is much larger. The blackest spot on the slide itself can have a density of more than 3 Bels, i.e., this spot attenuates the light by 10^{13} , i.e. 1000 times.



Measurement of the darkest area on a film copy.

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And the brightest spot only halves the light. Thus, a brightness interval of 1: 500 is obtained. A photograph re-captured on slide film will appear low-contrast. It will be immediately clear that we have a reproduction in front of us. Therefore, the **source** for reshooting should not be in the form of a photograph, but in the form of an image on a positive film.

Such a device, which removes one film image on another film, was widely used in cinema in the pre-digital era, it was called a trick machine. The most advanced equipment for combined filming in those years was the British Oxberry trick machine.



Oxbury trick machine (from the collection of the Polytechnic Museum of Moscow).

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How the two images are combined on this machine, I already wrote in the article "[Why did shadows appear on the lunar "sky"?](#) ", gave an example of how the same actor was combined in one shot, playing two different characters. It was Jean Paul Belmondo in the movie" The Beast ".



Combined shot. Actor J.P. Belmondo plays two roles at once.

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Our mutual friend Nikolai, who writes under the nickname ING250, discussing the NASA photo AS11-44-6592 with mounting signs, [gave an example of shooting doubles in a photograph](#) . After all, they knew how to do such a procedure as combining two different frames together

150 years ago. In a photograph taken around 1871, the photographer O. Raylander portrayed himself in two roles.



Freeze frame from Nikolai's video. Photographing a double.

Freeze frame from Nikolai's video. Photographing a double.

But even 150 years ago, no scissors were used and nothing was cut out. All the combination was carried out on the trick machine of that time, in general, on a conventional enlarger.

First, the first negative was inserted into the enlarger.



Printing on a photographic enlarger from a negative.

Printing on a photographic enlarger from a negative.

And the part of the image where the other person should appear was covered with an opaque mask. Most often, the hand was used as a "mask". The hand was placed between the lens and the printing stage, closer to the photographic paper. And they covered part of the image with their hand. For example, the right hand was used to cover the right half of the picture. To blur the border of the shadow from the hand, the hand was slightly swayed. Printed, naturally, in red light. The left side of the picture was exposed for 5-10 seconds.

Then, with a **round red glass** (see the photo), they blocked the light from the lens, changed the negative, and with the other hand, now with the left, covered the printed part of the image. The right side of the image was exposed with a slight wiggle of the hand.

And therefore, the picture was obtained without a sharp transition border. At the far leg of the easel, an arched piece on the floor, similar to a part of the leg of a standing hanger, smoothly blends into the background. In addition, there is a wide vertical shading band on the floor near the boots, apparently, the first shot (half on the left) ended on the right side with shading, and the second shot (half on the right) at the junction was light.



The photographer filmed himself in two roles. Around 1871.

The photographer filmed himself in two roles. Around 1871.

And no scissors are needed. And you don't need to cut anything, and you don't need to glue. And reshooting is not needed. Everything is done on a trick machine, sorry, under a photomagnifier.

As you understood from the example of an old photo, to connect two frames, we need a special projection device and two hands. One hand

will be considered a mask, the other a counter mask.

In books on photography, these masks are called shades.



Shades for photo printing.

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This is how you don't need to cut anything to get the lunar module against the background of the window. We need two masks - a mask and a counter mask and a special projection device, a trick machine. And we also need a special film, Intermediate. Regular film will not work, neither in graininess nor in contrast.

In order for the combined frame not to differ from the original in contrast, you need to use the Goldberg rule - the product of the negative gamut and the positive gamut should be equal to one. To do this, you need to pick up a special pair of films. And such a pair exists, it is called Intermediate.

And just in the next article I will talk about the Goldberg rule and the tricky Intermedia films. It is only at first glance to a person far from reproduction that everything seems simple: he took a slide image, re-shot it on the same film - and got a one-to-one duplicate. It doesn't

work out one to one. The contrast increases markedly, the latitude decreases.

That is why a separate discussion will be in the next article.

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Cameraman L. Konovalov was with you. Until next time!

